Department of Mathematics and Statistics Colloquium

The numerical range of a matrix: a map from matrices to shapes

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Abstract: Let A be an n-by-n matrix. The numerical range of A, denoted $W(A)$, is the set of all values of $\overline{x}^T A x$, for any complex unit vector x; that is, $W(A) = \left\{ \overline{x}^T A x \ : \ x \in \mathbb{C}^n, \overline{x}^T x = 1 \right\}$. This set $W(A)$ is a convex subset of the complex plane $\mathbb{C}$ which contains the eigenvalues of A, and hence can provide an approximation for the location of these eigenvalues. We will discuss some number theoretic theorems of the speaker's students, as well as a new integer invariant of these matrices which we call the Gau-Wu number.

Monday, September 21 at 3:45 in Roop 103

refreshments at 3:30